

1 CLAIMS

2 1. A Ceiling or Wall Apparatus for Reducing Condensation in Controlled

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4 Atmosphere Buildings comprising:

5 a. at least one insulating board means (7) having a first top surface (9) and an
6 exterior surface (4); the exterior surface (4) in atmosphere communication with the
7 interior of a building (20); the building having a ceiling (32) with an apex (36) and a
8 width d1 (38) from the ceiling apex (36) to a wall (40); the wall (40) at an interior
9 wall surface (42) having a height d2 (48) from a building foundation (24) to the
10 ceiling (32);

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13 b. at least one heating means (60) in thermal communication with and affixed
14 by heating means (60) affixing means (62) to the first top surface (9);

15 c. the first top surface (9) affixed by construction means to a ceiling (32) and
16 or to a wall (40); where to a ceiling (32) at an interior ceiling surface (34); the at least
17 one insulating board means (7) having a width d5 (33) which is less than or equal to
18 the ceiling width d1 (38); where to a wall (40) at an interior wall surface (42); the at
19 least one insulating board means (7) having a height d6 (43) which is less than or
20 equal to the wall (40) height d2 (48);

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22 d. at least one power means (65) connected by at least one power
23 interconnection means (64) with the at least one heating means (60) to operate the at
24 least one heating means (60) and at least one temperature control means (70) to
25 control the at least one power means (65) for temperature control of the at least one
26 heating means (60).

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30 2. A Ceiling or Wall Apparatus for Reducing Condensation in Controlled

1 Atmosphere Buildings of Claim 1 further comprising:

2 a. the at least one insulating board means (7) comprised of a first insulating
3 board means (7) having a first top surface (9) and an exterior surface (4) and a second
4 insulating board means (14) having a bottom surface (11) and a second top surface
5 (12); the exterior surface (4) is moisture resistant;

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7 b. the at least one heating means (60) affixed by heating means (60) affixing
8 means (62) to the first top surface (9) or the bottom surface (11);

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10 c. the first top surface (9) affixed by insulating board affixing means to the
11 bottom surface (11);

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13 d. the second top surface (12) affixed by construction means to a ceiling (32)
14 at an interior ceiling surface (34) or to a wall (40) at an interior wall surface (42).

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17 3. A Ceiling or Wall Apparatus for Reducing Condensation in Controlled

18 Atmosphere Buildings of Claim 2 further comprising:

19 a. the at least one insulating board means (7) comprising the first insulating
20 board means (7) and the second insulating board means (14) is composed of
21 insulation board;

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23 b. ceiling insulation means (80) intermediate the second insulating board
24 means (7) at the second top surface (12) and the interior ceiling surface (34).

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27 4. A Ceiling or Wall Apparatus for Reducing Condensation in Controlled

28 Atmosphere Buildings of Claim 3 further comprising:

29 a. the at least one heating means (60) composed of heat tape (60) or a fluid
30 heat transfer system means (60);

1 b. the at least one power means (65) composed of electrical power (65) or
2 fluid heat means;
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4 c. the at least one temperature control means (70) composed of thermostatic
5 control means (70) having at least one temperature sensing means (75) received
6 between at the first top surface (9) or between the first top surface (9) and the bottom
7 surface (11) and in temperature control communication with the power means (65).
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10 5. A Ceiling or Wall Apparatus for Reducing Condensation in Controlled
11 Atmosphere Buildings of Claim 4 further comprising:
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13 a. the at least one heating means (60) composed of heat tape (60) or a fluid
14 heat transfer system means (60) arranged, at the ceiling (32) to the first top surface
15 (9) or the bottom surface (11); to the first top surface (9) or the bottom surface (11) in
16 a serpentine or sinusoidal arrangement;
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18 b. the at least one heating means (60), at the ceiling (32), having a period p_1
19 (39) and an amplitude d_3 (34) of a width less than or equal to the ceiling width d_1
20 (38); the heating means (60), at the wall (40), having a period p_1 (39) and an
21 amplitude d_4 (49) of a height less than or equal to the height d_2 (48) of the wall (40)
22 at the interior wall surface (42);
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24 c. insulation board is rigid insulation board; the first top surface (9) affixed
25 flush against the bottom surface (11) such as to minimize space between said first top
26 surface (9) and the bottom surface (11).
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29 6. A Method for Reducing Ceiling or Wall Condensation in Controlled Atmosphere
30 Buildings of by use of the Apparatus of Claim 1 further comprising:

1 a. affixing at least one insulating board means (7) at a ceiling (32) and or a
2 wall (40) of an interior (22) of a building (20); the ceiling (32) having an apex (36)
3 and a width d1 (38) from the ceiling apex (36) to the wall (40); the wall (40) at an
4 interior wall surface (42) having a height d2 (48) from a building foundation (24) to
5 the ceiling (32); the at least one insulating board means (7) having a first top surface
6 (9) and an exterior surface (4); the exterior surface (4) in atmosphere communication
7 with the interior (22);
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10 b. heating the at least one insulating board means (7) with a heating means
11 (60) in thermal communication with and affixed by heating means (60) affixing
12 means (62) to the first top surface (9);
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14 c. affixing by construction means, the first top surface (9) to a ceiling (32) and
15 or a wall (40); affixing the first top surface (9) to a ceiling (32) at an interior ceiling
16 surface (34) where the at least one insulating board means (7) having a width d5 (33)
17 which is less than or equal to the ceiling width d1 (38); affixing the first top surface
18 (9) to a wall (40) at an interior wall surface (42) with the at least one insulating board
19 means (7) having a height d6 (43) which is less than or equal to the wall (40) height
20 d6 (43);
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23 e. supplying power means (65) connected by power interconnection means
24 (64) with heating means (60) to operate the heating means (60) and providing
25 temperature control means (70) to control the power means (65) for temperature
26 control of the heating means (60).
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30 7. A Method for Reducing Ceiling or Wall Condensation in Controlled Atmosphere
Buildings of by use of the Apparatus of Claim 6 further comprising:

1 a. forming the at least one insulating board means (7) of a first insulating
2 board means (7) having a first top surface (9) and an exterior surface (4) and a second
3 insulating board means (14) having a bottom surface (11) and a second top surface
4 (12); the exterior surface (4) is moisture resistant;

6 b. affixing the heating means (60) by heating means (60) affixing means (62)
7 to the first top surface (9) or the bottom surface (11);

9 c. affixing the first top surface (9) by insulating board affixing means to the
10 bottom surface (11);

12 d. affixing the second top surface (12) by construction means to a ceiling (32)
13 at an interior ceiling surface (34) or to a wall (40) at an interior wall surface (42).

15 8. A Method for Reducing Ceiling or Wall Condensation in Controlled Atmosphere
16 Buildings of by use of the Apparatus of Claim 7 further comprising:
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18 a. forming the at least one insulating board means (7) comprising the first
19 insulating board means (7) and the second insulating board means (14) of insulation
20 board;

22 b. adding ceiling insulation means (80) intermediate the second insulating
23 board means (7) at the second top surface (12) and the interior ceiling surface (34).

25 9. A Method for Reducing Ceiling or Wall Condensation in Controlled Atmosphere
26 Buildings of by use of the Apparatus of Claim 8 further comprising:
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28 a. providing insulation board of polyisocyanurate rigid insulation board;

29 b. providing heating means (60) composed of heat tape (60) or a fluid heat
30 transfer system means (60);

1 b. providing power means (65) composed of electrical power (65) or fluid
2 heat means;

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4 c. providing temperature control means (70) composed of thermostatic control
5 means (70) having a temperature sensing means (75) received between at the first top
6 surface (9) or between the first top surface (9) and the bottom surface (11) and in
7 temperature control communication with the power means (65).
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10 10. A Method for Reducing Ceiling or Wall Condensation in Controlled Atmosphere
11 Buildings of by use of the Apparatus of Claim 9 further comprising:
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13 a. arranging the heating means (60) composed of heat tape (60) or a fluid heat
14 transfer system means (60), at the ceiling (32) to the first top surface (9) or the
15 bottom surface (11); to the first top surface (9) or the bottom surface (11) in a
16 serpentine or sinusoidal arrangement;
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18 b. establishing the arrangement of the heating means (60), at the ceiling (32),
19 to have a period p_1 (39) and an amplitude d_3 (34) of a width less than or equal to the
20 ceiling width d_1 (38);
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22 c. establishing the arrangement of the heating means (60), at the wall (40),
23 having a period p_1 (39) and an amplitude d_4 (49) of a height less than or equal to the
24 height d_2 (48) of the wall (40) at the interior wall surface (42).
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